

### Quantum Theory Questions

For the following questions choose the best orbital from the list given to complete each statement.

1s      3s      3p      3d      3f      4s      4p<sub>y</sub>      5s      5p      5p<sub>x</sub>      5d<sub>xy</sub>      5d<sup>2</sup>

1. An electron in a(n) \_\_\_\_\_ subshell experiences the greatest effective nuclear charge in a many-electron atom.
2. A tin atom has 50 electrons. Electrons in the \_\_\_\_\_ subshell experience the lowest effective nuclear charge.
3. This orbital does not exist. \_\_\_\_\_
4. In a hydrogen atom, an electron in a \_\_\_\_\_ orbital can absorb a photon, but cannot emit a photon.
5. The \_\_\_\_\_ subshell contains three orbitals.
6. In which orbital does an electron in a phosphorus atom experience the greatest shielding \_\_\_\_\_?
7. In a ground-state manganese atom, the \_\_\_\_\_ subshell is partially filled.
8. The \_\_\_\_\_ orbital is degenerate with 5p<sub>y</sub> in a many-electron atom.

Write out the ground state electron configuration of copper, scandium, and platinum. How many valence electrons do each have?

What are the possible values of all four quantum numbers for each electron in a magnesium atom?

Draw the orbital diagram for the vanadium atom.